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**REMARKS**

The claims have been amended to more clearly recite method limitations and to improve antecedent basis.

The Final Office Action mailed May 22, 2003, has been received and reviewed. Claims 16-23, 25, and 27-30 are currently pending in the application. Claims 16-23, 25, and 27-30 stand rejected. Applicants note with appreciation the Examiner's indication of the correct location for the amendment to the specification. The Examiner states that amendments to claims 16, 28, 29, and 30 were entered. Final Office Action of May 22, 2003, p. 2. However, Applicants note that in Applicants' previous response, only claims 16 and 29 were amended.

Applicants propose to amend claims 17-23, 27, and 28, and respectfully request reconsideration of the application as proposed to be amended herein.

**35 U.S.C. § 112 Claim Rejections**

Claim 30 stands rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

The Examiner states that the limitation of "producing a final product comprising an alkyl ester and glycerol, wherein the glycerol is separated from the alkyl ester by controlling the temperature and pressure of the reaction conditions" is considered to be new matter. However, Applicants respectfully submit that this limitation is supported by the as-filed specification at p. 8, lines 5-20 of PCT/US 99/16669. The specification clearly discloses that "the product stream's temperature and/or pressure are modified to allow the least soluble product [glycerol] in the critical fluid to quantitatively drop out." *Id.*, lines 7-8. The temperature and/or pressure are modified again to allow the alkyl ester to drop out of the critical fluid medium. *Id.*, lines 14-17.

Since this limitation is supported by the as-filed specification, Applicants respectfully submit that the rejection of claim 30 be withdrawn.

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**35 U.S.C. § 102(b) Anticipation Rejections**Anticipation Rejection Based on Vieville *et al.*

Claims 29 and 30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Vieville *et al.* ("Vieville"). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Vieville discloses a method of esterifying oleic acid by methanol in supercritical carbon dioxide ("CO<sub>2</sub>"). P-toluenesulfonic acid ("p-TSA") and cation-exchange resins were used as catalysts in the esterification reaction. To esterify oleic acid to form methyl oleate, the oleic acid, methanol, and the catalyst were placed in a sapphire reactor and CO<sub>2</sub> was flowed into the reactor. The reaction catalyzed by p-TSA was conducted in a homogenous phase while the reaction catalyzed by the cation-exchange resins was performed in a heterogenous phase. During the esterification reaction, concentrations of the oleic acid and methyl oleate were quantified by high-pressure liquid chromatography.

Vieville does not describe each and every element of claim 29 because Vieville does not disclose "reacting the organic composition with the short chain alcohol or water in the presence of a catalyst at a temperature from about 20°C to about 200°C and a pressure from about 150 psig to about 4000 psig, wherein the reaction occurs in a single phase to produce a final product comprising an alkyl ester and glycerol and wherein said glycerol leaves the single phase as the glycerol is formed." Vieville does not disclose that glycerol is produced during the esterification reaction. Rather, Vieville only discloses that methyl oleate is produced. Since Vieville is silent regarding the production of glycerol, this element of claim 29 is not described in Vieville.

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The Examiner argues that glycerol is inherently produced in the esterification reaction of Vieville and inherently drops out of the reaction. Office Action of May 22, 2003, p. 5. However, even assuming *arguendo* that glycerol is produced, Vieville does not disclose that glycerol leaves the single phase as it is formed. Vieville does not disclose that any products of its esterification reaction leave the single phase as they are formed. In addition, the apparatus used in Vieville is not configured to allow the products to leave the single phase as they are formed. Rather, the apparatus is configured to perform the esterification reaction and conduct subsequent analysis of the products. Furthermore, Vieville is silent regarding separating the products formed by its esterification reaction and, therefore, does not disclose that its products leave the single phase as they are formed. The only separation described in Vieville is the separation of the organic phase and the solid catalyst by a filtration process. However, this separation is not performed by controlling the temperature and pressure of the reaction conditions. In addition, the disclosed separation is not analogous to the claimed invention because the separation is performed with conventional media and not critical fluid media.

Vieville also does not disclose that water reacts with the oleic acid to produce a final product. Rather, the water disclosed in Vieville is used to shift the equilibrium of the esterification reaction when conventional media, not supercritical media, are used. Water is not disclosed as a reactant in the esterification reaction when supercritical CO<sub>2</sub> is used.

Since Vieville does not describe each and every element of the claim, claim 29 is allowable and Applicants respectfully request that the rejection be withdrawn.

Vieville does not describe each and every element of claim 30 because Vieville does not disclose "reacting the organic composition with the C<sub>1</sub>-C<sub>4</sub> short chain alcohol or water in the presence of a catalyst in the single phase." Vieville does not disclose that water reacts with the oleic acid to produce a final product. Rather, the water disclosed in Vieville is used to shift the equilibrium of the esterification reaction when conventional media, not critical fluid media, are used. Water is not disclosed as a reactant in the esterification reaction when supercritical CO<sub>2</sub> is used.

Vieville also does not describe "producing a final product comprising an alkyl ester and glycerol, wherein the glycerol is separated from the alkyl ester by controlling the temperature and

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pressure of the reaction conditions.” Vieville is silent regarding the separation of the products of its esterification reaction. While Vieville discloses separating the organic phase and the solid catalyst by a filtration process, this is not a separation of glycerol from the methyl oleate produced during the reaction. In addition, the separation disclosed in Vieville is not achieved by controlling the temperature and pressure of the reaction conditions. Rather, the organic phase and the solid catalyst are separated by a filtration process. Furthermore, the disclosed separation is not analogous to the claimed invention because the separation is performed with conventional media, and not critical fluid media.

Since Vieville does not describe each and every element of the claim, claim 30 is allowable and Applicants respectfully request that the rejection be withdrawn.

### 35 U.S.C. § 103(a) Obviousness Rejections

#### Obviousness Rejection Based on Vieville and further in view of McDaniel *et al.*

Claims 16-23, 25, 27, and 28 stand rejected under 35 U.S.C. § 103(a) (“Section 103”) as being unpatentable over Vieville as applied to claims 29 and 30 above, and further in view of McDaniel *et al.* (“McDaniel”). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103 rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The 35 U.S.C. § 103(a) obviousness rejections of claims 16-23, 25, 27, and 28 are improper because the cited references do not teach or suggest all the claim limitations and do not provide a motivation to combine to produce the claimed invention.

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The teachings of Vieville are as previously summarized.

McDaniel discloses esterification of decanoic acid during supercritical fluid extraction. Experiments were conducted to determine whether methylation of decanoic acid occurred mainly during the collection step or during the supercritical fluid extraction. Methylation was found to occur mainly during the collection step. The effect of collection temperature on the methylation of decanoic acid was also investigated.

The Examiner states that claims 16-23, 25, 27, and 28 are rejected under Section 103 for the reasons made of record in the Office Action of November 29, 2002. Office Action of May 22, 2003, p. 4. However, in the Office Action of November 29, 2002, only claims 18, 19, 24, 25, and 28 were rejected under Section 103. Therefore, claims 16, 17, 20-23, and 27 were not previously rejected under this section and no reasons of record regarding these claims exist.

Vieville and McDaniel do not teach or suggest all the limitations of claim 16 because they do not teach or suggest "reacting the organic composition with the short chain alcohol or water in the presence of a catalyst in a single phase to produce a final product comprising an alkyl ester and glycerol, wherein said glycerol leaves the single phase as it is formed." Vieville does not teach or suggest this limitation for substantially the same reasons discussed above in the anticipation rejection of claim 30. Specifically, Vieville does not disclose that water reacts with the oleic acid to produce a final product, that glycerol is produced, or that glycerol leaves the single phase as it is formed. McDaniel does not cure these deficiencies in Vieville. In addition, McDaniel does not teach or suggest this limitation because McDaniel does not teach or suggest that the esterification reaction is performed in a single phase. Rather, McDaniel uses a fluid extraction technique with supercritical fluids to separate components of a mixture.

Claims 17-23, 25, and 27 depend from independent claim 16 and, as such, include all the limitations of claim 16. These claims are allowable, *inter alia*, as depending from an allowable base claim.

Claims 18 and 19 are further allowable because there is no motivation to combine the liquid catalyst of the supercritical fluid extraction of McDaniel with the teachings of Vieville to produce the claimed invention. As acknowledged by the Examiner, Vieville does not teach or suggest a liquid catalyst. Office Action of November 29, 2002, p. 6. Therefore, the Examiner

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relies on McDaniel as teaching a liquid catalyst in the esterification reaction. The Examiner states that McDaniel provides the motivation to combine the esterification of the fatty acid, as disclosed in Vieville, with the use of a liquid HCl catalyst, as disclosed in McDaniel, because McDaniel teaches the same process of Vieville. Office Action of November 29, 2002, p. 7. However, the fact that McDaniel allegedly teaches the same process as Vieville is not an objective reason that supports combining the cited references. Rather, this reasoning provided by the Examiner is conclusory and does not satisfy the Examiner's burden to establish a motivation to combine. In addition, the portion of McDaniel cited by the Examiner discloses supercritical fluid chromatography to separate products of an esterification reaction and, as such, uses a mobile phase to elute the desired products. This supercritical fluid chromatography technique is not similar to the esterification reaction of Vieville and, therefore, the reasoning provided by the Examiner does not provide the necessary motivation to combine to produce the claimed invention.

Claim 25 is further allowable because neither of the cited references teaches or suggests recycling the critical fluid medium.

Claim 27 is further allowable because neither of the cited references teaches or suggests including a critical fluid co-solvent selected from the group consisting of methanol, ethanol, butanol, and water.

Since the cited references do not teach or suggest all the limitations of claims 16-23, 25, and 27 or provide a motivation to combine, Applicants submit that the rejections are improper and should be withdrawn.

The cited references also do not teach or suggest all the limitations of claim 28. Specifically, the cited references do not teach or suggest "reacting the organic composition with the short chain alcohol or water in the presence of a catalyst in a single phase to produce a final product comprising an alkyl ester and glycerol, wherein said glycerol leaves the single phase as it is formed," for substantially the same reasons discussed above in the Section 103 rejection of claim 16.

The cited references also do not teach or suggest "separating said glycerol from said final product by modifying the temperature and pressure of the final product" and "separating said

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alkyl ester product from said critical fluid by modifying the temperature and pressure of the critical fluid medium," as recited in claim 28. The Examiner states that McDaniel discloses controlling the temperature of the reaction to separate the alkyl ester from the critical fluid medium. Office Action of May 22, 2003, p. 6. However, the portion of McDaniel cited by the Examiner actually discusses the effect of collection temperature on conversion of decanoic acid to the methyl ester. In other words, this portion of McDaniel investigates the effect of temperature on the esterification reaction. Contrary to the Examiner's assertions, this portion of McDaniel does not teach or suggest that the temperature and pressure are modified to separate the components of the esterification reaction. Rather, as later noted by the Examiner, McDaniel discloses that extraction is used to separate the methyl ester from the critical fluid medium. Office Action of November 29, 2002, p. 7. Therefore, McDaniel does not teach or suggest that the temperature or pressure is modified to separate the glycerol from the final product or the alkyl ester from the critical fluid medium.

In addition, no motivation to combine the cited references exists for substantially the same reasons previously discussed in the rejection of claims 16-23, 25, and 27.

Since the cited references do not teach or suggest all the claim limitations of claim 28 or provide a motivation to combine, Applicants respectfully request that the rejection be withdrawn.

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**ENTRY AND PURPOSE OF AMENDMENTS**

The proposed amendments to claims 17-23, 27, and 28 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search. The claims have been amended to more clearly recite method limitations and to improve antecedent basis. As such, Applicants respectfully assert that no surrender or disclaimer of claim scope and, more specifically, of the broadest possible range of equivalents to which Applicants may be entitled has been effectuated.

Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

**CONCLUSION**

Claims 16-23, 25, and 27-30 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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